



DENNIS

MOTOR FIRE
APPLIANCES

D

Dennis Turbine Motor Fire Engines

DENNIS BROS. Ltd.

ONSLOW STREET,
GUILDFORD, ENGLAND.



Telegrams :—
DENNIS, GUILDFORD.

Telephone :—
129 GUILDFORD.

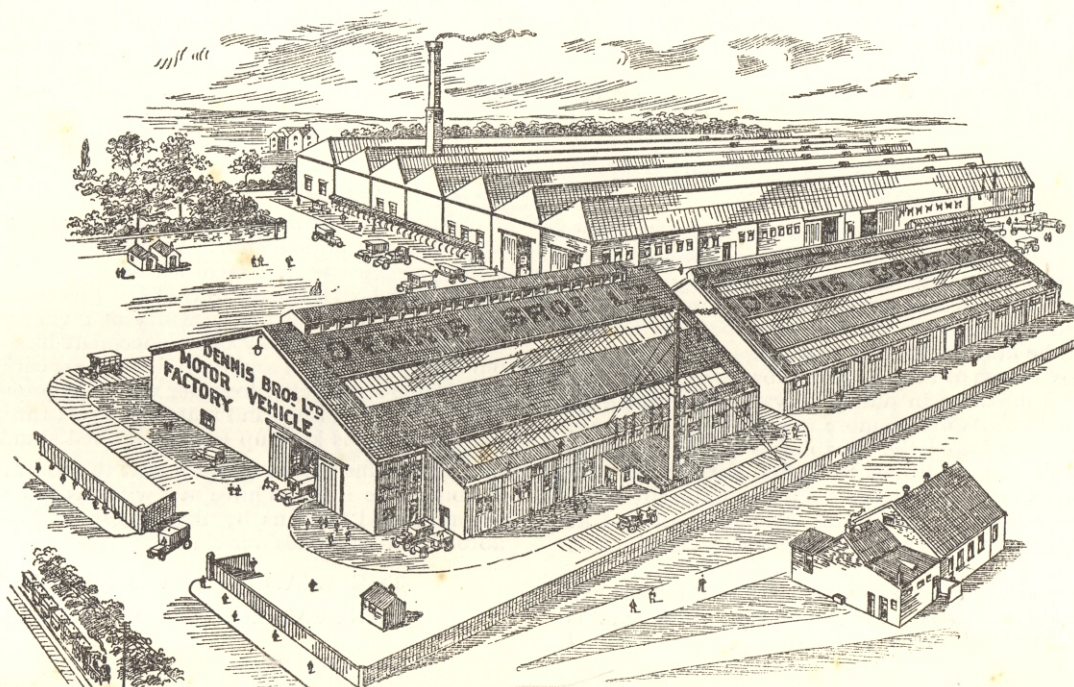
Code :—
A.B.C. (5th Edition).

Motor Pumps.

Motor Escape
Tenders.

Motor Chemical
Machines.

Motor
Ambulances,
Etc., Etc.



Made by
the
Oldest
Motor
Manufacturers
in
England.

General View of Woodbridge Factories, Guildford.

NEARLY 200 MOTOR FIRE ENGINES SUPPLIED AND ON ORDER.

INTRODUCTION.



Introduction to this Catalogue of DENNIS Motor Fire Appliances a few remarks may not appear out of place, dealing with the various considerations which influenced our early design, and led us to pioneer a type on original lines as far as the Fire Service of that time was concerned.

The question of bringing out a Motor Fire Pump first received our attention, as a result of a request on the part of a leading Fire Brigade Officer, who, doubtless, foresaw what has proved to be the case, that a firm like ourselves, being essentially Motor builders, with many years' experience in the manufacture of all classes of machines for goods and passenger transport, were best equipped for the work, as we were able to construct a motor on well tested and standardised lines.

Now, having selected the type of chassis most suitable for the work, from our standard models, paying due regard to the general conditions a Fire Brigade Motor has to contend with, then came the all-important question of the choice of pump—whether same should be

RECIPROCATING OR TURBINE,

and we wish it to be remembered that we were starting with a perfectly open mind on the subject, with no pre-determined prejudices to weigh in the balance either way ; and, as a result, after very thorough investigation, the technical details of which we would not deal with here, we boldly pinned our faith on the turbine type, and we are pleased to say that all the most important Fire Brigades in this, and other countries, who, by reason of their facilities for carefully observing and testing their Appliances in actual service, were quick to recognise the undoubted merits of the more modern type of pump.

We successfully demonstrated the capabilities of our complete machine to cope with all the conditions to be met with in the Fire Service, and the various doubts and prejudices which naturally arose in the mind of the ever-cautious Firemaster were gradually set at rest, with the result that the turbine pump has become an established fact.

Another matter which intending purchasers of Fire Engines have to consider is the choice of final drive ; the option being either what is known as the "LIVE AXLE" or as, alternatively, the "CHAIN DRIVE SYSTEM."

Here, again, it would be out of place to deal with the many technical points as balance in favour of the former ; and we would content ourselves in pointing out that we once more proved to be the pioneers of a successful system of live axle transmission by embodying worm and wheel gearing into its construction, a feature which has been an important detail of DENNIS Motors of all types for many years ; and there is every evidence of the history of Touring Car practice repeating itself in the rapid establishing of this system to the practical exclusion of the chain drive in engines of up-to-date design ; and, doubtless, the decision of the Army Transport Department of this country in not only showing preference for the live axle system, but definitely informing intending applicants for certificates under their Subvention Scheme, that vehicles of the chain drive type will not be considered, has finally disposed of this feature in modern motor design ; as the conditions which would have influenced the War Office officials in this decision would take into consideration the necessity of absolute reliability, combined with efficiency and simplicity, which conditions are of the greatest importance in choosing a Fire Brigade Motor.

Another important point which would receive the careful attention of the discriminating purchaser of a Fire Brigade Motor would be the factory facilities and organisation for turning out INTERCHANGEABLE and STANDARDISED work, and, doubtless, our recognising the necessity of giving this matter the closest attention from the very commencement has contributed largely to our success ; and, in addition, the utmost care is taken in the choice of suitable steels, etc., together with a rigorous system of inspection of both workmanship and materials, used throughout our chassis, to see that same is kept up to the required standard.

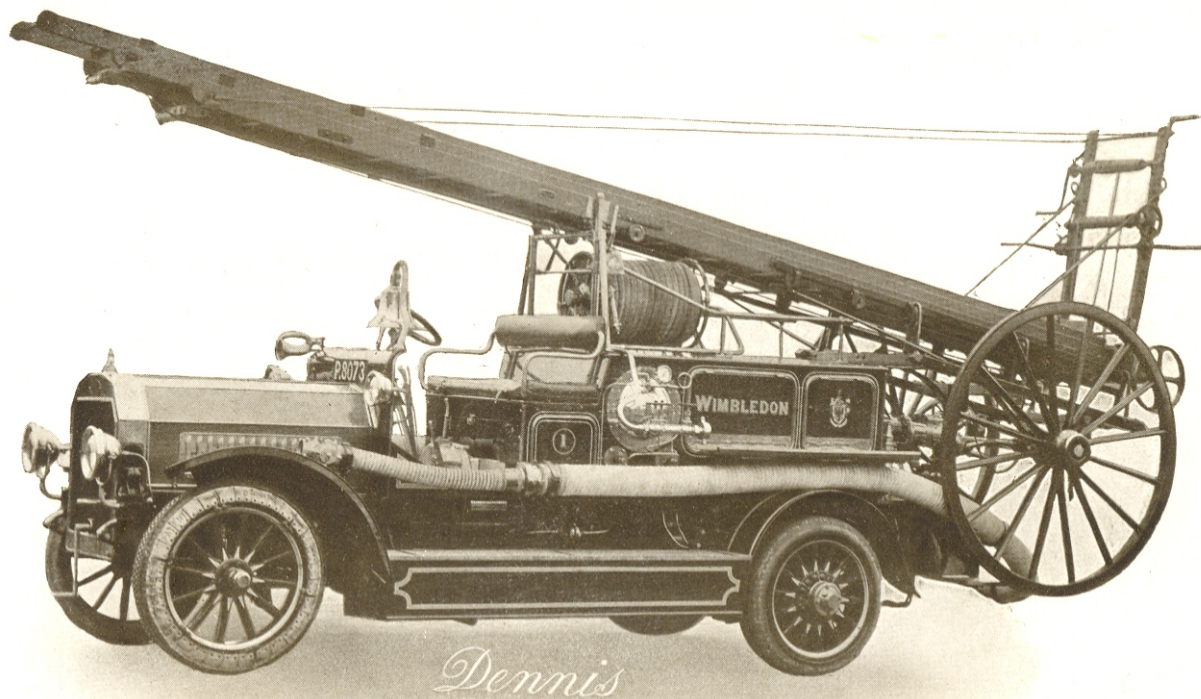
In conclusion, we are sure that the continued success which our Turbine Fire Engines have met with, as shown by the many repeat orders placed with us by the largest Brigades both at home and abroad, fully justifies our claiming to be

THE LEADING MOTOR FIRE APPLIANCE
MANUFACTURERS OF THIS COUNTRY.

DENNIS BROS. (1913), LTD.

ALL PREVIOUS PRICES AND SPECIFICATIONS CANCELLED

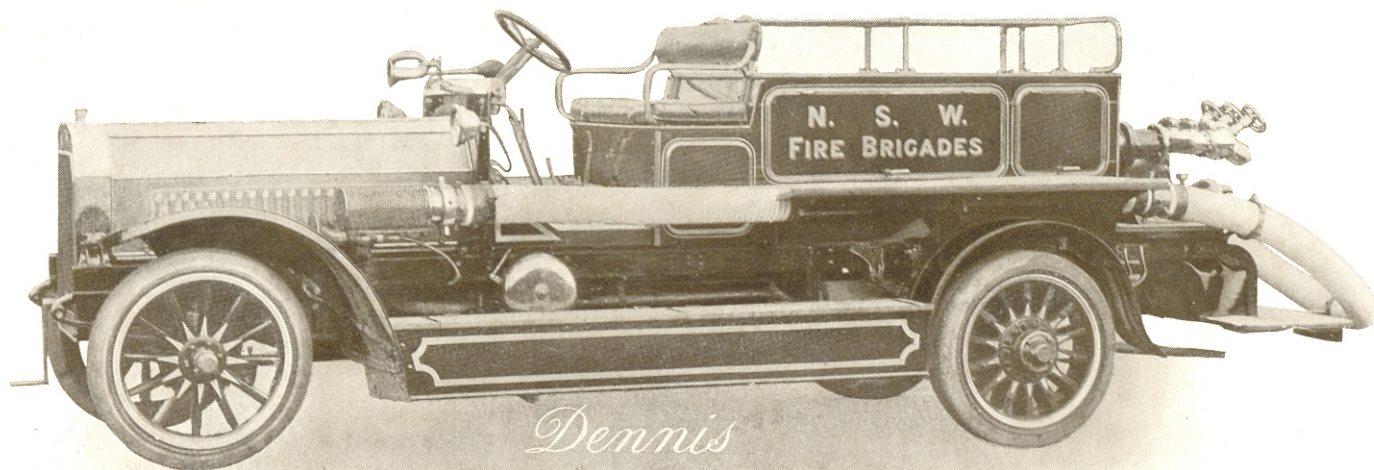
“Dennis” 60 h.p. 400-Gallon Turbine Motor Fire Engine



Two Engines supplied to the Wimbledon Fire Brigade. Fitted with 50ft. sliding carriage escape, 30 gallon chemical tank, hose reel and 180ft. hose, electric side and head lamps with dynamo and accumulators, “non-skid” tyre protectors, direct suction adapter, etc.

THESE ADDITIONAL FITTINGS QUOTED FOR ON RECEIPT OF ENQUIRY

“Dennis” 75 h.p. 500-Gallon Turbine Motor Fire Engine



As a result of the successful working of two engines previously supplied to the NEW SOUTH WALES GOVERNMENT a repeat order for 9 more was placed with us. A speciality is made in the construction of all types of Fire Engines for Colonial and Foreign work where the design has to be modified to suit local conditions.

FOR SPECIFICATION AND PARTICULARS SEE PAGE 5.

General Specification of "Dennis" 75 h.p. 500-Gallon Turbine Motor Fire Engine

As illustrated on page 4

ENGINE (6 cylinder).—Of enclosed vertical type, cylinders cast separate, valves mechanically operated and placed on opposite sides. Pressure feed lubricating system on latest principle. This engine will develop a maximum of approximately 75 h.p. on the brake, and is 5in. bore by 6in. stroke, designed in all details essentially for Fire Brigade work.

CARBURETTER.—Of latest design, automatic.

IGNITION.—High tension waterproof Bosch magneto, and also high tension electric with accumulator and distributor, connected with two sets of sparking plugs with turn-over switch, and to be coupled up in such a way that each separately or both ignitions together can be used; twelve sparking plugs being fitted in all.

CLUTCH.—Leather-lined, cone-shaped, of large diameter, and approved design, with outside adjustment for spring tension and a universal joint contained in the clutch to avoid all strain on the crank shaft, through any distortion of the frame which may occur.

SPEED GEAR BOX.—Special alloy aluminium casting, four speeds forward and reverse, which would enable the machine to attain a speed of 35 miles per hour on the level. Gate control with ball bearings throughout; machine also capable of ascending a gradient of one in five with full load.

PUMP GEAR BOX.—Special alloy aluminium oil-tight casing, gear wheels mounted on hardened shafts and ball bearings.

FOOT BRAKE.—A drum of large diameter on the end of the gear box shaft, and two cast-iron slippers, bearing on this drum, are operated by means of a double cam movement. Brakes capable of holding machine on a gradient of one in five.

ARBOR AND PUMP SHAFTS.—Of high tensile steel.

BACK AXLE.—The "Dennis" Patent No. 3224, with worm gear, the special features of this axle are "RELIABILITY" and "SILENT RUNNING."

BACK BRAKES.—Internal expanding and made of two cast-iron shoes operating against the inside of large diameter drums on the rear hubs, entirely cased in and dustproof.

DIFFERENTIAL.—Parallel pinion type with six planets and two star wheels.

FRONT AXLE.—Of modern design and ample proportions, the whole being of wrought steel.

STEERING.—Worm and segment irreversible, adjustable with ball connecting joints; all joints covered with leather casings. Turning radius as small as possible.

LUBRICATION.—Entirely automatic throughout, being pressure feed system on well tested and satisfactory lines.

FRAME.—Channel steel specially strengthened at the points necessary; under frame carrying engine on three point suspension.

COOLING.—Water circulation by gear driven centrifugal pump of large capacity, and radiator being of the film tube type with brass envelope. Suitable fan fitted for the induced draught. Especially large radiator would be fitted to ensure satisfactory cooling. A separate bye-pass from the pump is taken to the top of the radiator to afford additional cooling when pumping.

WHEELS.—Artillery wood or steel pattern, suitable for 34in. solid rubber tyres.

TYRES.—Dunlop, or Shrewsbury & Challiner, 34in. rear, 34in. diameter, and 4in. single front, 34in. diameter, or other approved make. Block section tyres or non-skid arrangement quoted for as extras if required.

PUMP.—The pump is of the centrifugal multi-stage, high pressure, turbine type, made by GWYNNE, LTD., London, the well-known pump manufacturers.

DUTY OF PUMP.—The pump approximately delivers 500 gallons per minute at, 140 lbs. pressure, and will deliver up to 700 gallons per minute at lower pressure when working through a 100ft. length of 2½in. unlined canvas hose; also capable of drawing water 27ft. with ease and certainty. Pressure and vacuum gauges fitted to dashboard in front of driver.

AIR PUMP CHARGING APPARATUS.—This charging apparatus is in DUPLICATE, there being two double acting cylinders each working independently, and constructed of a capacity capable of obtaining water from 26ft. to 27ft. in 20 to 25 seconds. The air pump is brought into action by a lever from the driver's seat, and on the water being obtained, the outlets, if required, automatically open.

INLET.—Polished gunmetal fitting and screwed at the end for suction hose couplings, to suit existing standard of the Brigade.

OUTLET.—Arranged with polished gunmetal wheel valve quick acting fittings, and three outlets, to suit Brigade couplings.

PETROL TANK.—Under driver's seat, holding 20 gallons.

SUCTION HOSE.—Three 10ft. lengths of suction hose 5in. diameter inside, imbedded wire type, fitted with polished gunmetal screwed unions, with full clearance, copper strainer at end, polished, and same to have union for attaching to suction. Couplings to be made to Brigade Standard.

BODY.—Of the best seasoned wood, English Ash frame, and mahogany panels, and arranged to carry some 1,500ft. of delivery hose, and also fire engine tools in separate locker. To seat four men each side facing sideways, and driver and officer in front; brass handrails. Two separate long boxes arranged at the sides in a convenient position for carrying stand pipes and other gear, the lids forming side steps. Polished brass edging round all steps and tops covered with pyramid pattern aluminium tread. Also polished brass round edges of hose box and lockers, and a rear step is fitted, and will accommodate another fireman.

PAINTING AND FINISHING.—The whole, including chassis, painted in first-class style, fire engine red, lined white with gold leaf mouldings, and having the name of the Fire Brigade painted on in suitable position in double shaded gold block letters.

LAMPS.—Two side and one tail, four-volt electric working off on switch placed on dash.

ACCUMULATOR.—One 40-ampere hour 4-volt continuous current for ignition, and one 60-ampere hour 4-volt for lamps.

SPARES, TOOLS, ETC.

Box spanners	Taper pins
Screwdrivers	1 Foot steam hose pipe
1 File	2 Engine spanners
1 Oil can	Washers
Copper and asbestos washers	2 Hose pipe clips
Pliers	Insulation tape
Hammer	1 Each large and small adjustable spanner
Asbestos string	1 Brass horn
Spare bolts and nut	Necessary spanners, etc., for pump and
4 Sparking plugs	hose fittings, including large spanner
1 Petrol funnel	for tightening suction hose.
Split pins	

Price complete, to this specification, £1,150

PAYMENT.—Cash on completion of satisfactory trials at Guildford.

For Guarantee, etc., see back cover (inside).

APPROXIMATE SHIPPING DIMENSIONS, Etc., OUTSIDE PACKING CASE.

Length	... ..	18ft. 6in.
Height	... ..	7ft. 0in.
Width	... ..	6ft. 6in.
Weight	... ..	5 tons.

Cost of packing and delivering F.O.B. London, £25 net.

General Specification of "Dennis" 60 h.p. 400-Gallon Turbine Motor Fire Engine

As illustrated on page 7

ENGINE.—Of enclosed vertical type, cylinders cast in pairs, valves mechanically operated and placed on opposite sides, with airtight aluminium covers over same. Pressure feed lubricating system on latest principle. This engine will develop a maximum of approximately 65 h.p. on the brake, and is 5in. bore by 7in. stroke, designed in all details essentially for Fire Brigade work.

CARBURETTER.—Of latest design, automatic.

IGNITION.—High tension waterproof Bosch magneto, and also high tension electric with accumulator and distributor, connected with two sets of sparking plugs with turn-over switch, and to be coupled up in such a way that each separately or both ignitions together can be used; eight sparking plugs being fitted in all.

CLUTCH.—Leather lined, cone shaped, of large diameter and approved design, with outside adjustment for spring tension and a universal joint contained in the clutch to avoid all strain on the crank shaft, through any distortion of the frame which may occur on uneven ground.

SPEED GEAR BOX.—Special alloy aluminium casting four speeds forward and reverse, which would enable the machine to attain a speed of 30 miles per hour on the level. Gate control with ball bearings throughout; machine also capable of ascending a gradient of 1 in 5 with full load.

PUMP GEAR BOX.—Special alloy aluminium oil-tight casing, silent double Helical gear wheels mounted on hardened shafts and ball bearings.

FOOT BRAKE.—A drum of large diameter on the end of the gear box shaft, and two cast iron slippers, bearing on this drum are operated by means of a double cam movement. Brakes capable of holding machine on a gradient of 1 in 5.

ARBOR AND PUMP SHAFTS.—Of high tensile steel.

BACK AXLE.—The "Dennis" Patent No. 3224, with worm gear, the special features of this axle are "RELIABILITY" and "SILENT RUNNING," also the whole of the running weight of the machines is supported on tubular fixed axles.

BACK BRAKES.—Internal expanding and made of two cast iron shoes operating against the inside of large diameter drums on the rear hubs, entirely cased in and dustproof.

DIFFERENTIAL.—Parallel pinion type with six planets and two star wheels.

FRONT AXLE.—Of modern design and ample proportions, the whole being of wrought steel.

STEERING.—Worm and segment irreversible, adjustable with ball connecting joints; all joints covered with leather casings. Turning radius to be as small as possible.

LUBRICATION.—Entirely automatic throughout, being pressure feed system on well tested and satisfactory lines.

FRAME.—Channel steel specially strengthened at the points necessary; under-frame carrying engine on three-point suspension.

COOLING.—Water circulation by gear-driven centrifugal pump of large capacity, and radiator being of the film tube type with brass envelope. Suitable fan fitted for the induced draught. Especially large radiator would be fitted to ensure satisfactory cooling. A separate bye-pass from the pump is taken to the top of the radiator to afford additional cooling when pumping.

WHEELS.—Artillery wood or steel pattern, suitable for 34in. solid rubber tyres.

TYRES.—Dunlop, Polack, or Shrewsbury & Challiner, 8in. rear, 34in. diameter, and 4in. single front, 34in. diameter, or other approved make. Block section tyres or non-skid arrangements quoted for as extras if required.

PUMP.—The pump is of the centrifugal multi-stage high pressure turbine type, made by GWYNNES LTD., LONDON, the well-known pump manufacturers.

DUTY OF PUMP.—The pump approximately delivers 400 gallons per minute at 120 lbs. pressure, and will deliver up to 500 gallons per minute at lower pressure when working through a 100ft. length of 2½in. unlined canvas hose; also capable of drawing water 27ft. with ease and certainty. Pressure and vacuum gauges fitted to dashboard in front of driver.

AIR PUMP CHARGING APPARATUS.—This charging apparatus is in DUPLICATE, there being two double acting cylinders, each working independently, and constructed of a capacity capable of obtaining water from 26ft. to 27ft. in 20 to 25 seconds. The air pump is brought into action by a lever from the driver's seat, and on the water being obtained, the outlets, if required, automatically open.

INLET.—Polished gun metal fitting and screwed at the end for suction hose couplings, to suit existing standards of the Brigade.

OUTLET.—Arranged with polished gun metal wheel valve quick acting fittings, and two outlets to suit Brigade couplings.

PETROL TANK.—Under driver's seat, holding 20 gallons.

SUCTION HOSE.—Three 10ft. lengths of suction hose, 5in. diameter inside, imbedded wire type, fitted with polished gun metal screwed unions, with full clearance, copper strainer at end, polished; and same to have union for attaching to suction. Couplings to be made to Brigade standard.

BODY.—Of the best seasoned wood, English ash frame, and mahogany panels, and arranged to carry some 1,500lb. of delivery hose, and also fire engine tools in separate locker. To seat four men each side facing sideways, and driver and officer in front; brass hand rails. Two separate long boxes arranged at the sides in convenient position for carrying stand pipes and other gear, the lids forming side steps. Polished brass edging round all steps and tops covered with pyramid pattern aluminium tread. Also polished brass round edges of box and lockers, and a rear step is fitted, and will accommodate another fireman.

PAINTING AND FINISHING.—The whole, including chassis, painted in first-class style, fire engine red, lined white with gold leaf mouldings, and having the name of the Fire Brigade painted on in suitable position in double shaded gold block letters.

LAMPS.—Two side and one tail, 4-volt electric working off on switch placed on dash.

ACCUMULATORS.—One 40-ampere hour 4-volt continuous current for ignition, and one 60-ampere hour 4-volt for lamps.

SPARES, TOOLS, Etc.—

Box spanners	Split pins
Screwdrivers	Taper pins
1 File	1 Foot steam hose pipe
1 Oil can	2 Engine spanners
Copper and asbestos washers	Washers
Pliers	2 Hose pipe clips
Hammer	Insulation tape
Asbestos string	1 Each large and small adjustable spanner
Spare bolts and nuts	1 Brass horn
4 Sparking plugs	Necessary spanners, etc., for pump and
1 Petrol funnel	hose fittings, including large spanner for
	tightening suction hose.

Price complete, to this specification, £990

PAYMENT.—Cash on completion of satisfactory trials at Guildford.

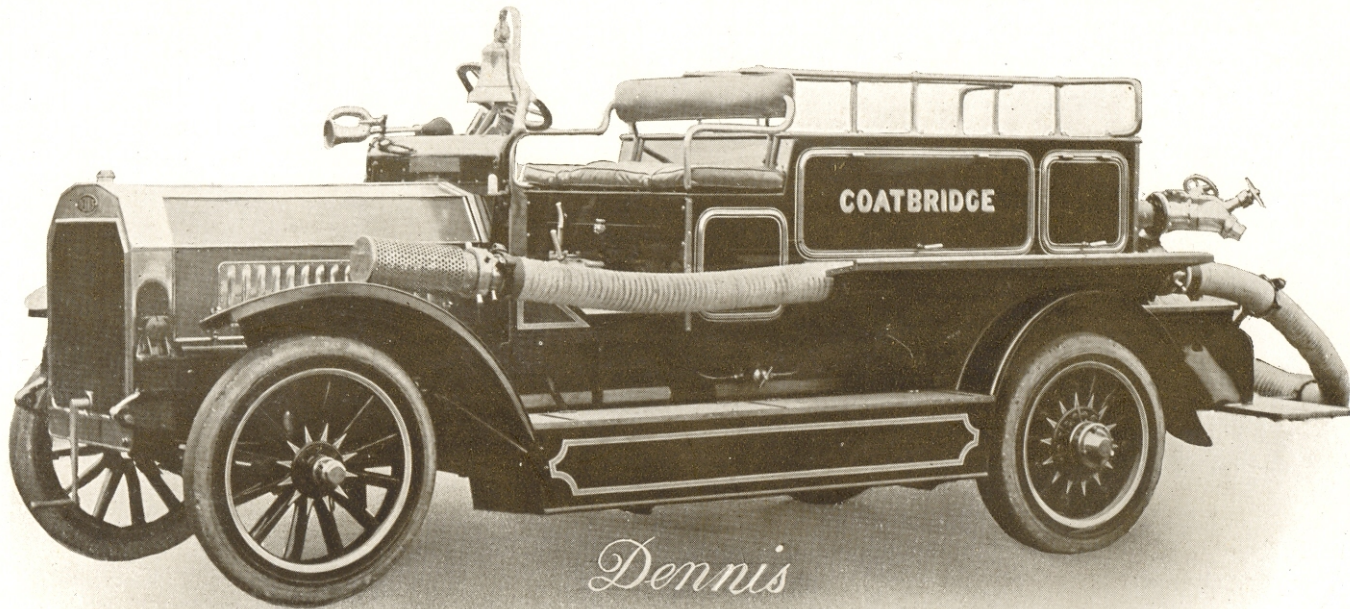
For guarantee, etc., see back cover (inside).

APPROXIMATE SHIPPING DIMENSIONS, Etc., OUTSIDE PACKING CASE.

Length	... ..	18ft. 0in.
Height	... ..	7ft. 0in.
Width	... ..	6ft. 6in.
Weight	... ..	4 tons 18cwt.

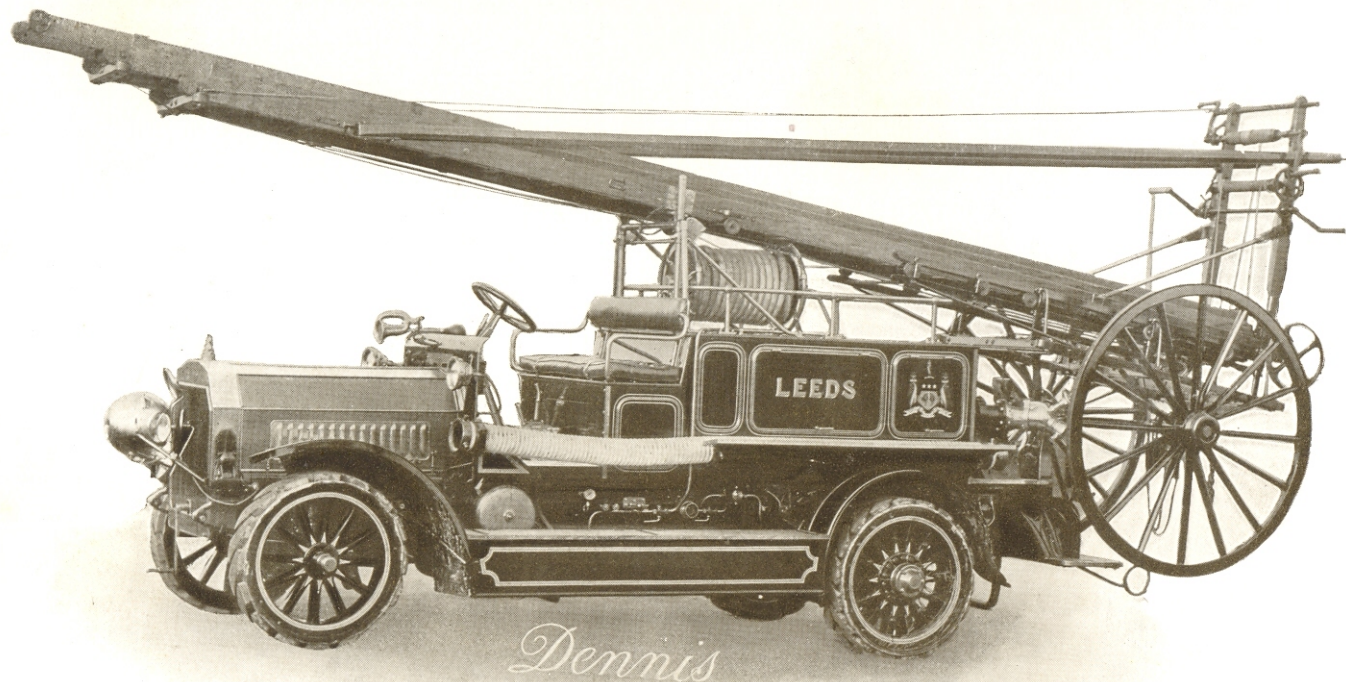
Cost of packing and delivering F.O.B. London, £25 net.

“Dennis” 60 h.p. 400-Gallon Turbine Motor Fire Engine



One of 18 Fire Engines supplied into this district of Scotland, including 5 for the GLASGOW FIRE BRIGADE.
FOR SPECIFICATION AND PARTICULARS SEE PAGE 6.

“Dennis” 60 h.p. 400-Gallon Turbine Motor Fire Engine



Second repeat order received from the Leeds Corporation. Engine fitted with 55ft. sliding carriage escape, 30 gallon tank with separate first aid pump, hose reel and hose, etc., this arrangement doing away with the necessity of chemical charges or gas bottles, and the tank can be filled while the jet is working, enabling same to be kept at work continually. Also Dennis block section tyres fitted. These additional fittings quoted for on receipt of enquiry.

Some "Dennis" Turbine Motor Fire Engines, etc., Supplied and On Order

BIRMINGHAM 10

- 1 Anglo Persian Oil Co.
- 1 Athens
- 1 Auckland, New Zealand
- 1 Bingley
- 1 Basingstoke
- 2 Bilbao
- 1 Birkenhead
- 2 Brisbane
- 5 Bradford
- 3 Burmah Oil Co.
- 1 Bahia, Brazil
- 1 Christchurch, New Zealand
- 1 Cape Hill Brewery
- 1 Copenhagen
- 2 Croydon
- 1 Coatbridge
- 1 Dunedin, New Zealand
- 1 Egham
- 1 Fremantle, W. Australia
- 2 Frederiksberg
- 1 Gosforth
- 1 Gentofte, Copenhagen
- 2 Govan

LONDON 28

- 2 Great Eastern Railway Co.
- 1 Great Western Railway Co.
- 1 Greenock
- 2 Glasgow Salvage Corps
- 5 Glasgow Fire Brigade
- 1 Guildford
- 1 Ghent
- 1 Halifax
- 1 Ipoh, Malay Peninsula
- 1 India Office
- 1 Karachi
- 2 King of Siam
- 2 Kingston-on-Thames
- 2 Keighley
- 1 King's Heath
- 3 Lanarkshire
- 1 Leeds
- 1 Lincoln
- 2 Liverpool Salvage Association
- 1 Loughborough
- 1 Manchester
- 1 Malvern
- 2 Newcastle-on-Tyne

SYDNEY 11

- 1 New Malden
- 3 Nottingham
- 1 Newbury
- 1 Oporto
- 1 Pretoria
- 1 Penang
- 1 Rowley Regis
- 2 Reading
- 1 Rockhampton, Queensland
- 1 Renfrewshire
- 1 Rutherglen
- 1 Southport
- 1 Selangor
- 1 South Brisbane
- 1 Stockton-on-Tees
- 1 Scottish Wholesale Co-operative Society
- 1 Worthing
- 1 Wath-on-Dearne
- 2 Watford
- 1 Wallsend
- 1 West Ham
- 2 Wimbledon
- 1 West Bromwich

- 1 The Rt. Hon. The Earl of Macclesfield
- 2 Johannesburg

General Specification of "Dennis" 45 h.p. 300-Gallon Turbine Motor Fire Engine

As illustrated on page 11

ENGINE.—Of enclosed vertical type, valves mechanically operated and placed on opposite sides. This engine is designed in all details essentially for Fire Engine work, and on the latest principles throughout, where reliability has been especially studied.

CARBURETTER.—Of latest design, automatic, ensuring an easy start and rapid acceleration.

LUBRICATION.—Automatic high pressure system, working front pump driven off cam shaft.

IGNITION.—High tension waterproof Bosch magneto and also high tension electric with accumulator and distributor connected with two sets of sparking plugs with turnover switch, and to be coupled up in such a way that each separately or both ignitions together can be used; eight sparking plugs being fitted in all.

CLUTCH.—Leather lined, cone shaped, of large diameter, and approved design.

SPEED GEAR BOX.—Special alloy aluminium casting, four speeds forward and reverse, which would enable the machine to attain a speed of 30 miles per hour on the level. Gate control with ball bearings throughout; machine also capable of ascending a gradient of 1 in 6 with full load.

FOOT BRAKE.—A drum of large diameter on the end of the gear box shaft, and two cast iron slippers, bearing on this drum, are operated by means of a double cam movement. Brakes capable of holding machine on gradient of 1 in 6.

ARBOR AND PUMP SHAFTS.—Of high tensile steel.

BACK AXLE.—The "Dennis" Patent No. 3224, with worm gear; the special features of this axle are "RELIABILITY" and "SILENT RUNNING." Also all the running weight is carried on tubular fixed axles, the live axle merely transmitting the torque.

BACK BRAKES.—Internal expanding and made of two cast iron shoes operating against the inside of large diameter drums on the rear hubs, entirely cased in and dust proof.

PUMP GEAR BOX.—Special alloy aluminium oil-tight casing with gear wheels mounted on hardened shafts, and ball bearings.

DIFFERENTIAL.—Parallel pinion type, with six planets and two star wheels.

FRONT AXLE.—Of modern design and ample proportions, the whole being of wrought steel.

STEERING.—Worm and segment, irreversible, adjustable, with ball connecting joints; all joints covered with leather casings. Turning radius as small as possible.

SPRINGS.—Best laminated steel springs of ample strength and flexibility, fitted with grease lubricators throughout. All holes bushed.

FRAME.—Channel steel specially strengthened at the points necessary; underframe carrying engine on three-point suspension.

COOLING.—Water circulation by gear-driven centrifugal pump of large capacity, and radiator being of the film tube type, with brass envelope. Suitable fan fitted for the induced draught. Especially large radiator would be fitted to ensure satisfactory cooling.

A separate bye-pass from the pump is taken to the top of the radiator to afford additional cooling, when pumping.

WHEELS.—Artillery wood or steel pattern, suitable for 34in. solid rubber tyres; interchangeable on both machines.

TYRES.—Shrewsbury & Challiner, Dunlop or Polak, 34in. twin rear, 34in. diameter, and 34in. single front, 34in. diameter, or other approved make.

Also block section tyres or non-skid arrangements quoted for extra, according to requirements.

PUMP.—The pump is of the centrifugal high pressure turbine type, made by GWYNNE LTD., LONDON, the well-known pump manufacturers. It is made on the latest GWYNNE principle, and is of the two-staged balanced standard type, and constructed in gun metal where necessary.

DUTY OF PUMP.—The pump will deliver approximately 300 gallons per minute at 120 lbs. pressure, and will deliver up to 400 gallons per minute at lower pressure, when working through 100ft. of 2½in. diameter unlined canvas hose.

AIR PUMP CHARGING APPARATUS.—This charging apparatus is constructed in gun metal throughout, and is capable of a capacity for obtaining water 26ft. to 27ft. in 20 to 25 seconds. The air pump is brought into action by a lever from the driver's seat, and on the water being obtained, the outlet if required automatically opens. The air pump is entirely disconnected when the main pump is charged and the greatest attention has been given to the question of reliability.

INLET.—Polished gun metal fitting, and screwed at the end for suction hose coupling, to suit existing standards of the Brigade, if required.

OUTLET.—Arranged with polished gun metal wheel valve quick acting fittings, and two outlets to suit Brigade couplings.

DASH.—Top curved to afford protection to fittings.

PETROL TANK.—Under driver's seat, holding 20 gallons. Sufficient to keep the engine running continuously for at least four hours.

SUCTION.—Three 10ft. lengths of four 5-ply best quality complete with couplings and copper strainer. Arranged on suitable brackets on the engine, 20ft. coupled up ready for use and spare length on right-hand side.

BODY.—Of the best seasoned wood and arranged to carry some 1,200ft. of delivery hose, and also Fire Engine tools in separate locker. To seat four men each side facing sideways, and driver and officer in front; brass hand rails to seats, etc. Two separate lockers arranged at the side in convenient position for carrying spare parts and tools requisite for chassis, and accumulators for electric lights. Polished brass edging round all steps, and ends covered with pyramid pattern aluminium tread.

PAINTING AND FINISHING.—The whole, including chassis, painted in first-class style, Fire Engine red, lined white with gold leaf mouldings, and having the name of the Fire Brigade painted on in suitable position in double shaded gold block letters.

DRIVER'S SEAT.—To have plain leather cushion.

LAMPS.—Two best quality electric side and one tail, fitted up complete with brackets and wiring, also switch.

ACCUMULATOR.—One 60-ampere 4-volt for lamps, and one 30-ampere 4-volt for ignition.

SPARES AND TOOLS.—

1 Petrol funnel	Split pins
Box spanners	1 Foot steam hose pipe
Screwdrivers	2 Engine spanners
1 File	Washers
1 Oil can	2 Hose pipe clips
Copper and asbestos washers	Insulation tape
Pliers	1 Each large and small adjustable spanner
Hammer	1 Brass horn
Asbestos string	Necessary spanners, etc., for tightening
Spare bolts and nuts	suction hose, and for pump and hose fittings

Price for Engine complete, as per specification, £875

SHIPPING PARTICULARS, PACKED.—

Length	... ..	16ft. 0in.
Width	... ..	6ft. 6in.
Height	... ..	6ft. 6in.
Total weight	... ..	4 tons 5 cwt.

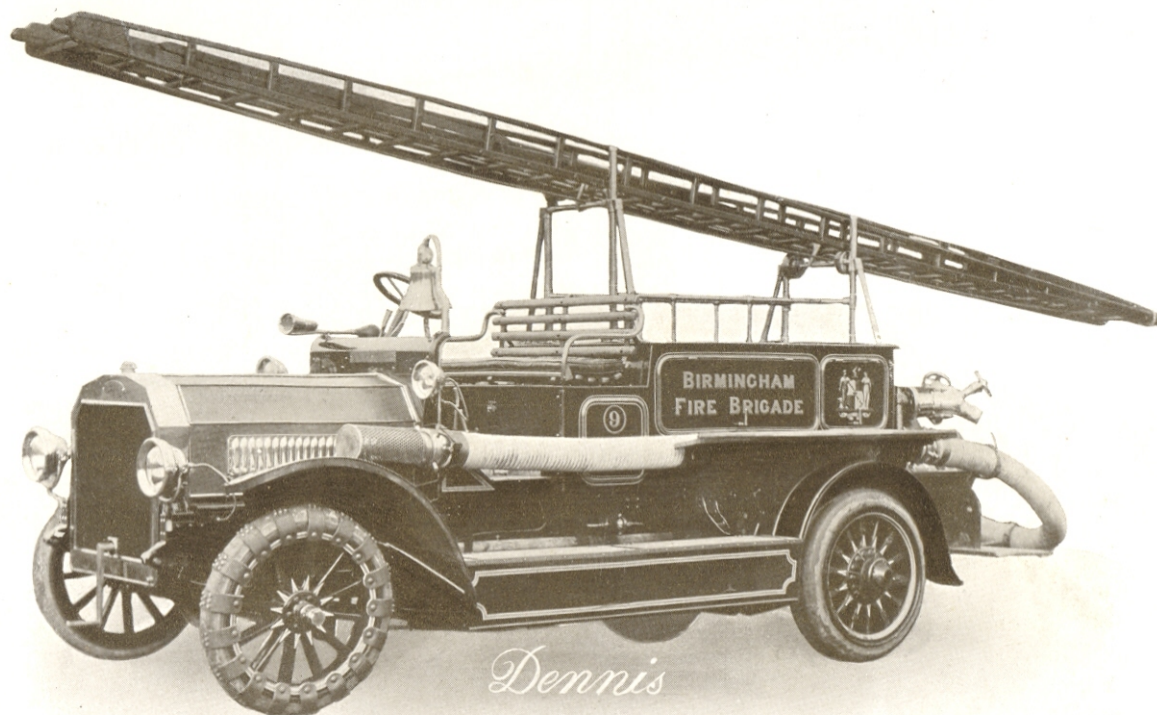
Cost of packing and delivery, F.O.B. London, £25 net.

“ Dennis ” 45 h.p. 300-Gallon Turbine Motor Fire Engine



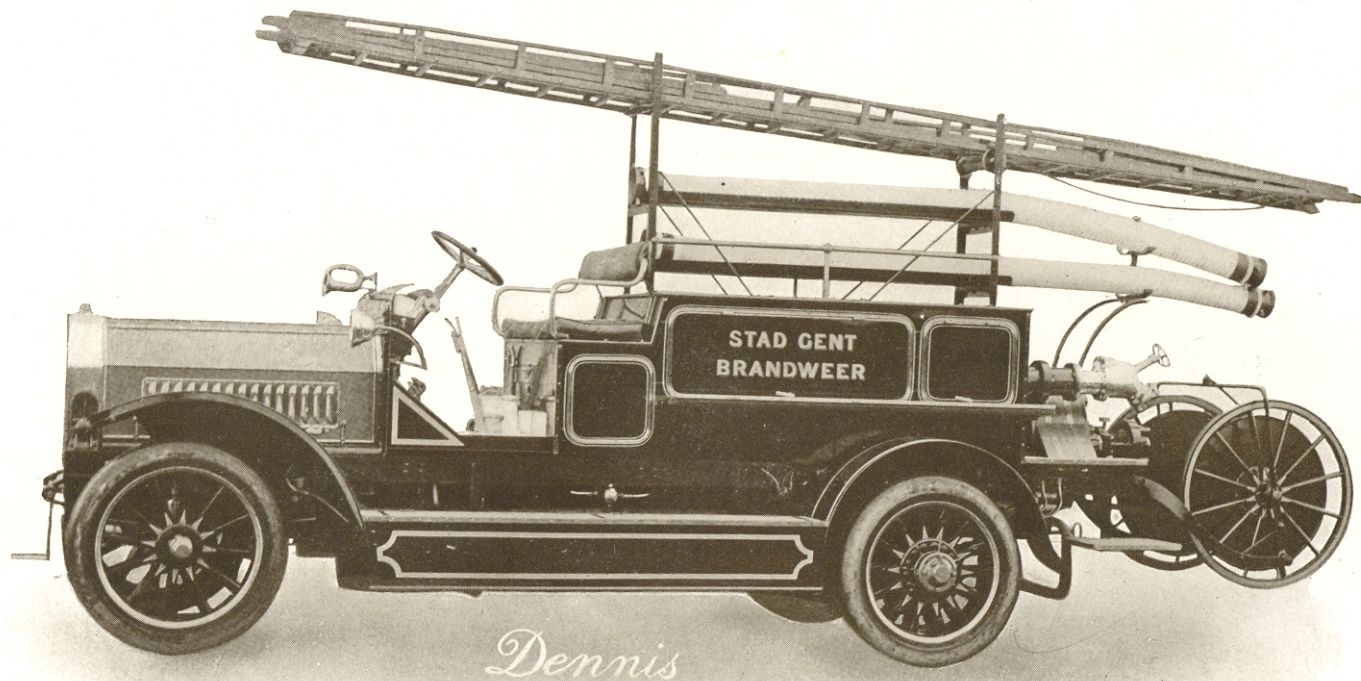
One of 28 Motor Fire Appliances which we have constructed for the London Fire Brigade, including 17 Motor Turbine Pumps, their last order being for 12 machines and constituting the SEVENTH REPEAT.

“Dennis” 60 h.p. 400-Gallon Turbine Motor Fire Engine



TEN Motor Fire Engines supplied to the BIRMINGHAM Corporation Fire Department.

“Dennis” Continental Type 60 h.p. Turbine Motor Fire Engine



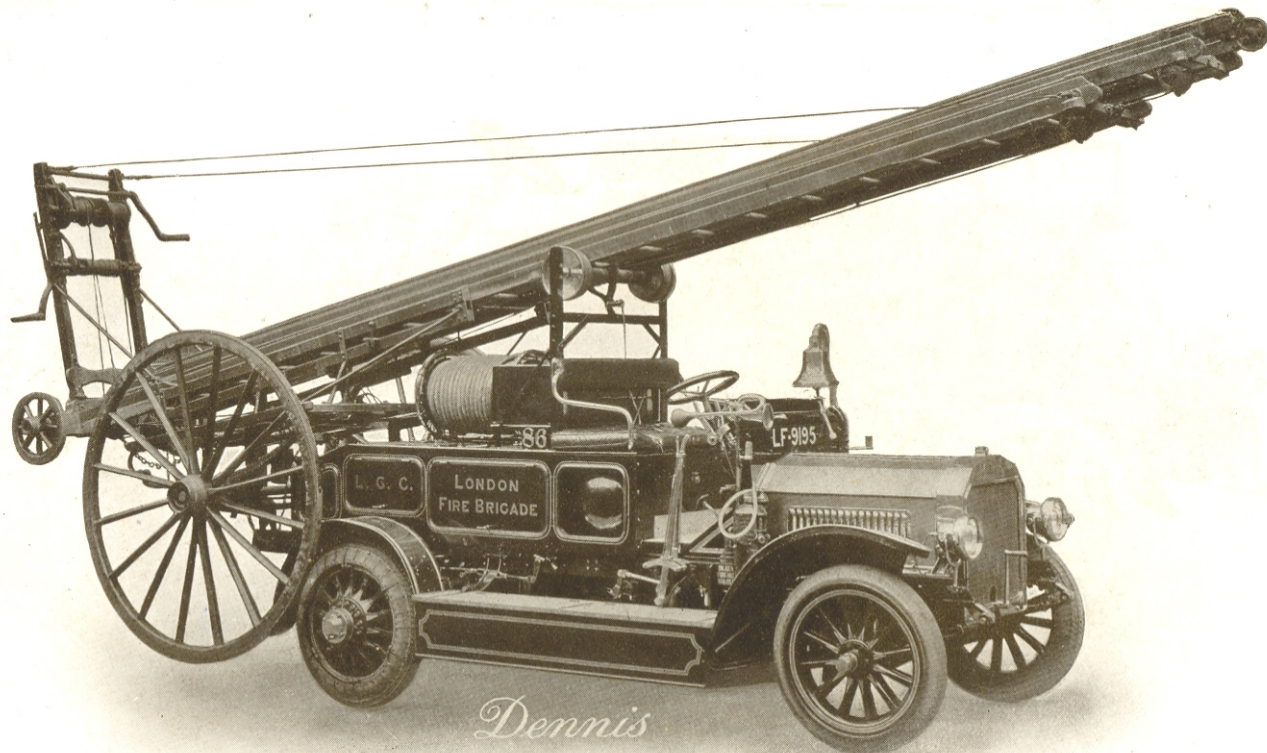
Fire Engine supplied to the GHENT Municipality for the Protection of the INTERNATIONAL EXHIBITION, 1913.

“Dennis” 60 h.p. Turbine Motor Fire Engine



FIRE ENGINE DELIVERED TO ATHENS TO THE ORDER OF THE GREEK GOVERNMENT.

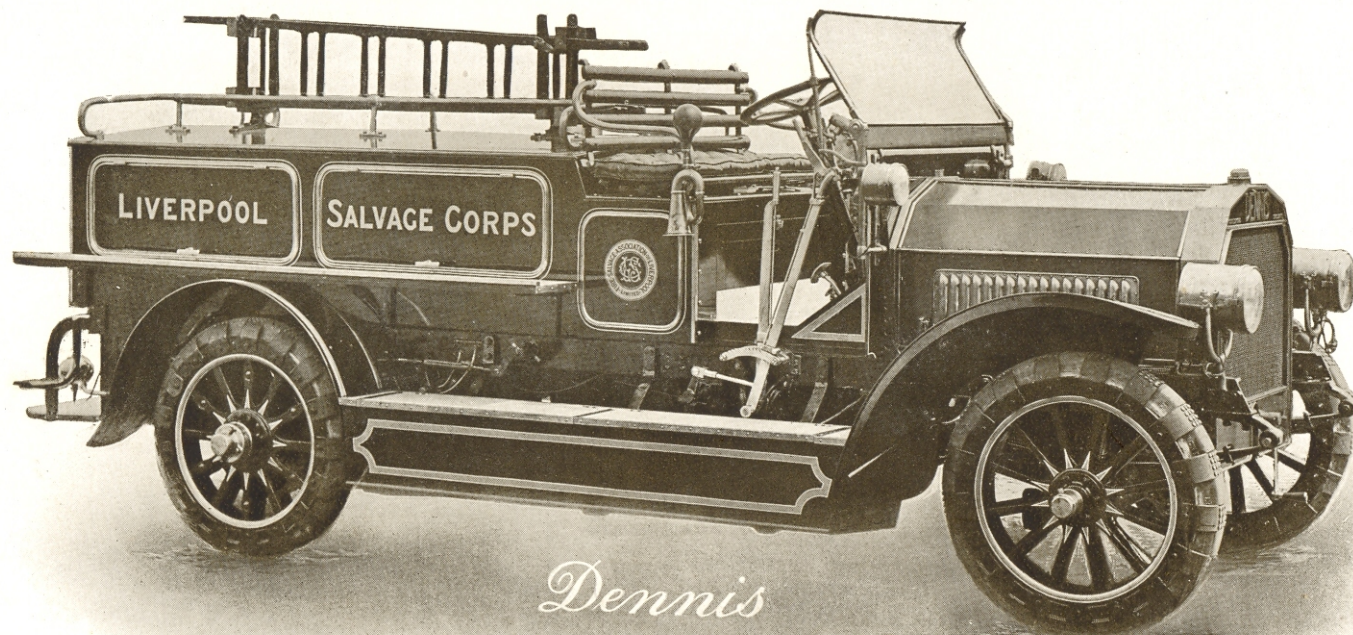
“Dennis” Motor Tender and Escape Carrier



Seven 50 h.p. 4-Cylinder Motor Escape Tenders, exactly as illustrated, supplied to the LONDON FIRE BRIGADE, complete with 30 gallon chemical tanks, hose reel and hose, etc.

All classes of First Aid Motor Tenders, from 20 h.p. upwards, supplied on receipt of enquiries. We have machines of this sort in service with the London, Birmingham, Glasgow and other Brigades.

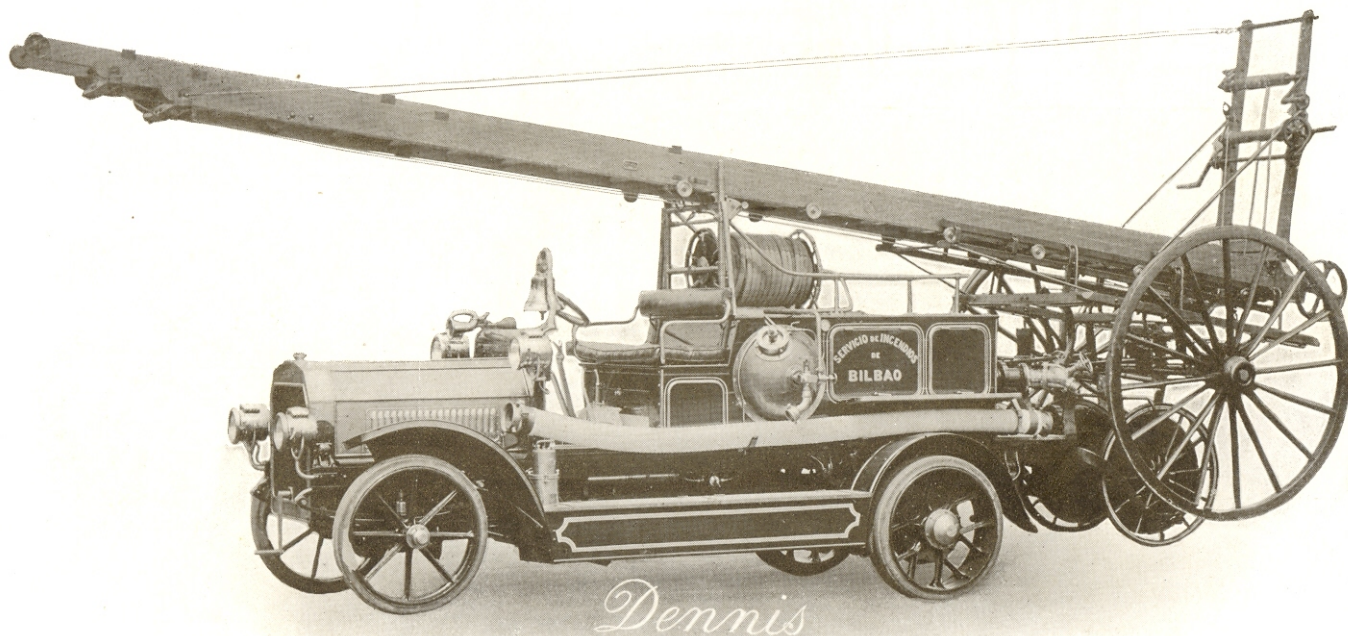
“Dennis” Motor Salvage and Rescue Appliances



Two 40 h.p. 4-Cylinder Salvage Vans supplied to the LIVERPOOL SALVAGE CORPS; also 2 exactly similar machines to the GLASGOW SALVAGE CORPS.

All classes and sizes of Motor Tenders for Fire Brigade and other purposes quoted for on application.

"Dennis" 60 h.p. 400-Gallon Turbine Motor Fire Engine



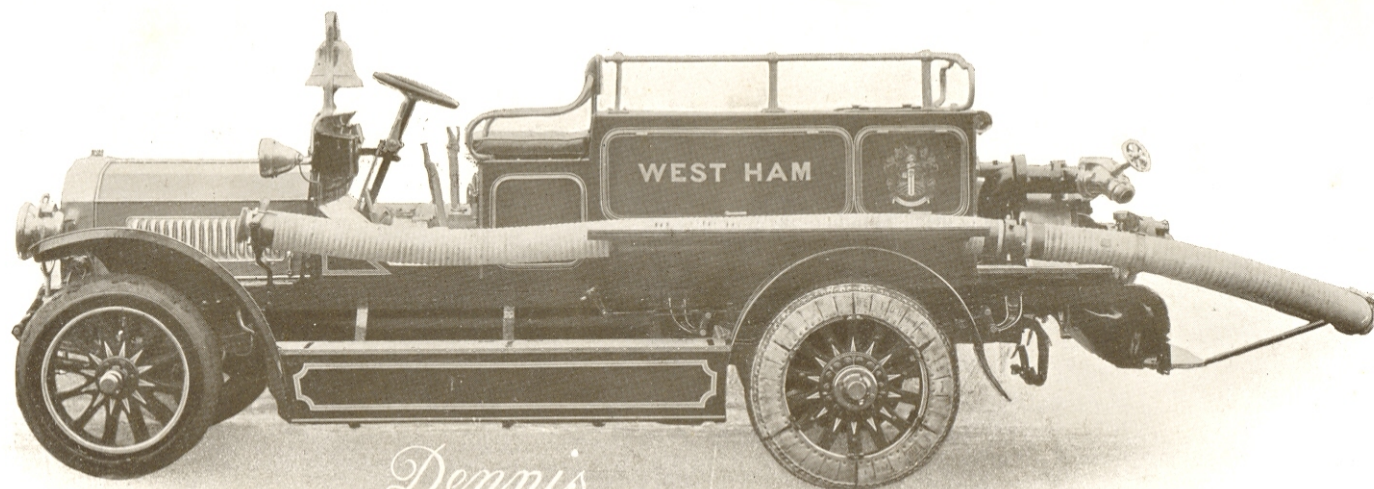
ONE OF AN ORDER FOR 2 ENGINES FOR THE BILBAO MUNICIPALITY.

Fitted with 60 foot sliding carriage fire escape, 60-gallon chemical tank. Hydraulic Hose reel and hose, also detachable delivery hose reel at back. Additional fittings quoted for on application.

AN ESPECIAL STUDY HAS BEEN MADE IN THE CONSTRUCTION OF FIRE ENGINES FOR CONTINENTAL AND FOREIGN BRIGADES, AND WE HAVE ENGINES OF SIMILAR DESIGN IN USE IN PORTUGAL, GREECE, BELGIUM, DENMARK, SPAIN, INDIA, PERSIA, SIAM, MALAY PENINSULA, etc.

NOTE.—Steel wheels can be supplied without extra charge for our standard models.

“Dennis” 30 h.p. 150-Gallon Turbine Motor Fire Engine



A new model recently put on the market with a view to meeting a popular demand for a small and light Motor Pump, and at a price within the range of the lesser Corporations and Fire Brigades. The Engine will travel at a speed of 25 m.p.h. on the level with six to eight men, 1,200ft. hose, 30 to 35ft. escape ladder, and other usual Fire Brigade gear, and climbs a gradient of 1 in 6 with ease. The weight of the Engine without men and gear is approx. 2 tons.

General Specification of "Dennis" 30 h.p. 150-Gallon Turbine Motor Fire Engine

As illustrated on page 18

ENGINE.—Of enclosed vertical four-cylinder type, developing 30 brake horse-power. Pressure fed lubricating system with duplex gear oil pump driven off cam shaft. All valves cased in free from dirt and grit. Thermo syphon cooled, with large diameter water pipes and ample capacity jackets. All parts of the best selected material and best workmanship throughout.

CARBURETTER.—Of latest design, automatic.

IGNITION.—High tension waterproof Bosch dual magneto, with accumulator and turnover switch.

CLUTCH.—Leather-lined, cone-shaped, of large diameter, and approved design.

SPEED GEAR BOX.—Special alloy aluminium casting, four speeds forward and reverse, which would enable the machine to attain a speed of 25 miles per hour on the level. Gate control with ball bearings throughout; machine also capable of ascending a gradient of 1 in 6 with full load.

PUMP GEAR BOX.—Special alloy aluminium oil-tight casing, silent chain transmission; all shafts and chain wheels hardened and mounted on ball bearings.

FOOT BRAKE.—A drum of large diameter on the end of the gear box shaft, and two slippers, bearing on this drum, are operated by means of a cam movement. Brakes capable of holding machine on a gradient of 1 in 6.

ARBOR AND PUMP SHAFTS.—Of high tensile steel.

BACK AXLE.—The "Dennis" Patent No. 3224, with worm gear. The special features of this axle are "RELIABILITY" and "SILENT RUNNING"; also the whole of the running weight of the machine is supported on tubular fixed axles.

BACK BRAKES.—Internal expanding and made of two cast steel shoes operating against the inside of large diameter drums on the rear hubs, entirely cased in and dust proof.

DIFFERENTIAL.—Parallel pinion type with six planets and two star wheels.

FRONT AXLE.—Of modern design and ample proportions, the whole being of wrought steel.

STEERING.—Worm and segment irreversible, adjustable with ball-connecting joints; all joints covered with leather casings. Turning radius made as small as possible.

LUBRICATION.—Entirely automatic throughout, being pressure feed system on well tested and satisfactory lines.

FRAME.—Pressed steel specially strengthened at the points necessary; underframe carrying engine on three point suspension.

COOLING.—Water circulation on Thermo Syphon principle, and radiator being of the gilled tube type, with brass envelope. Suitable fan fitted for the induced draught. Especially large radiators would be fitted to ensure satisfactory cooling. A separate bye-pass from the pump is taken to the top of the radiator to afford additional cooling when pumping.

WHEELS.—Artillery wood pattern, suitable for 32in. solid rubber tyres.

TYRES.—Dunlop, Polack, or Shrewsbury & Challiner, 6in. rear, 32in. diameter, and 3in. single front, 32in. diameter, or other approved make. Block section tyres or non-skid arrangements quoted for as extras if required.

PUMP.—The pump is of the centrifugal multi-stage high pressure turbine type, made by G.WYNNES, LTD., LONDON, the well-known pump manufacturers.

DUTY OF PUMP.—The pump approximately delivers 150 gallons per minute at 120 lbs. pressure, and will deliver up to 200 gallons per minute at lower pressure, when working through a 100ft. length of 2½in. unlined canvas hose; also capable of drawing water 27ft. with ease and certainty. Pressure and vacuum gauges fitted to dash-board in front of driver.

AIR PUMP CHARGING APPARATUS.—This charging apparatus is constructed of a capacity capable of obtaining water from 26ft. to 27ft. in 20 to 25 seconds. The air pump is brought into action by a lever from the driver's seat, and on the water being obtained, the outlets if required, automatically open.

INLET.—Polished gunmetal fitting and screwed at the end for 3½in. suction hose couplings.

OUTLET.—Arranged with polished gunmetal wheel valve quick acting fittings, and two outlets to suit Brigade couplings.

PETROL TANK.—Under driver's seat, holding 12 gallons.

SUCTION HOSE.—Three 10ft. lengths of suction hose 3½in. diameter inside, imbedded wire type, fitted with polished gunmetal screwed unions, with full clearance, copper strainer at end, polished; and same to have union for attaching to suction.

BODY.—Of the best seasoned wood, English Ash frame, and mahogany panels, and arranged to carry some 1,200ft. of delivery hose, and also fire engine tools in separate locker. To seat three men each side facing sideways, and driver and officer in front; brass hand rails. Two separate long boxes arranged at the sides in convenient position for carrying stand pipes and other gear, the lids forming side steps. Polished brass edging round all steps, and tops covered with pyramid pattern aluminium tread. Also polished brass round edges of hose box and lockers, and a rear step is fitted.

PAINTING AND FINISHING.—The whole, including chassis, painted in first-class style, fire engine red, lined white with gold leaf mouldings, and having the name of the fire brigade painted on in suitable position in double shaded gold block letters.

LAMPS.—Two side, and one tail, 4-volt electric working off switch placed on dash.

ACCUMULATORS.—One 40-ampere hour 4-volt continuous current for ignition, and one 60-ampere hour 4-volt for lamps.

SPARES AND TOOLS, ETC.—

Box spanners	Taper pins
Screwdrivers	1 Foot steam hose pipe
1 File	2 Engine spanners
1 Oil can	Washers
Copper and asbestos washers	2 Hose pipe clips
Pliers	Insulation tape
Hammer	1 each large and small adjustable spanner
Asbestos string	1 Brass horn
Spare bolts and nuts	Necessary spanners, etc., for pump and
4 Sparking plugs	hose fittings, including large spanner
1 Petrol funnel	for tightening suction hose
Split pins	

Price complete, to this specification, £700

APPROXIMATE SHIPPING DIMENSIONS, Etc. OUTSIDE PACKING CASE.—

Length	... ..	17ft. 0in.
Height	... ..	6ft. 6in.
Width	... ..	6ft. 6in.
Weight	... ..	3 tons
Cost of packing and delivering, F.O.B. London, £20.		

General Specification of "Dennis" 45 h.p. Motor Fire Tender

As illustrated on page 21

ENGINE.—Of enclosed vertical type with four cylinders. The crank shaft is made from nickel steel with ground bearing surfaces. There is a bearing between each cylinder which is kept well lubricated with oil under pressure from a tank supplying a sump in the crank case containing a force feed pump gear driven from the cam shaft. Valves placed on opposite sides and the whole constructed on most modern lines.

CARBURETTER.—Of latest design, automatic, ensuring reliability and easy starting.

IGNITION (double).—High tension Bosch magneto, and also high tension electric, with accumulator and distributor connected with two sets of sparking plugs with turnover switch, and to be coupled up in such a way that each separately or both ignitions together can be used; eight sparking plugs being fitted in all.

CLUTCH.—Leather-lined, cone-shaped, of large diameter, and improved design.

SPEED GEAR BOX.—Special alloy aluminium casting, four speeds forward and reverse, which would enable the machine to attain a speed of 30 miles per hour on the level. Gate control with ball bearings throughout; machine also capable of ascending a gradient of 1 in 6 with full load at 8 m.p.h.

FOOT BRAKE.—A drum of large diameter on the end of the gear box shaft, and two cast-iron slippers, of a double cam movement. Brakes capable of holding machine on gradient of 1 in 6.

ARBOR SHAFT.—Of high tensile steel.

BACK AXLE.—The "Dennis" Patent No. 3224, with worm gear. The special features of this axle are "RELIABILITY" and "SILENT RUNNING," the whole of the running weight being supported on tubular hardened steel fixed axles and the torque only transmitted to road wheels by the live axles.

BACK BRAKES.—Internal expanding and made of two cast-iron shoes operating against the inside of large diameter drums on the rear hubs, entirely cased in and dustproof.

DIFFERENTIAL.—Parallel pinion type, with six planets and two star wheels.

FRONT AXLE.—Of modern design and ample proportions, the whole being of wrought steel.

STEERING.—Worm and segment, irreversible, adjustable with ball connecting joints; all joints covered with leather casings.

FRAME.—Channel steel, specially strengthened at the points necessary.

COOLING.—Water circulation by gear-driven centrifugal pump of large capacity, and radiator being of the gilled tube type, with brass envelope. Suitable fan fitted for the induced draught.

WHEELS.—Artillery wood or steel pattern, suitable for 34in. solid rubber tyres.

TYRES.—Shrewsbury & Challiner, Dunlop or Polack 3½ twin rear, 34in. diameter, and 3½ single front, 34in. diameter, or other approved make.

PETROL TANK.—Under driver's seat, holding 20 gallons.

FIRST AID TANK.—A galvanised steel 30-gallon tank fitted in body behind driver's seat, and used in connection with a small rotary double helical gear pump, arranged so that it can be instantly thrown into action by lever at side of frame, and driven by special gear wheels of steel working off clutch shaft.

This pump to deliver water from tank to hose reel at 120 lbs. pressure, and a suitable ball release valve fitted returning water to tank through bye-pass should nozzle be shut off when pump is working. A pressure gauge placed in suitable position, also hydrant attachment for filling tank in addition to large cover on top to allow of bucket filling.

NOTE.—An alternative method with ordinary cylindrical copper tank with gas bottles or chemical charges could be supplied if required.

FIRST AID HOSE.—150ft. best quality three-quarter red rubber hose, complete with couplings and shut off branch, and coiled on hydraulic hose reel placed on top of body, and arranged so that hose can be run off from either side. Hose reel arranged with polished brass hand wheel and brackets.

LADDER.—Telescopic type, built in two sections, arranged to be used singly if required, length when extended 30ft. Ladder to be made on double trussed pattern, with stop hooks, natural wood varnished. Mounted on polished brass brackets, over the engine, in sloping position.

FINISH.—The engine to be painted and finished in very best style. Vermilion carefully outlined in black, and gold lettered in shaded gold block letters, on panels each side.

BODY.—Framed up in best selected English Ash, and panelled with best mahogany. Forming driver's seat containing petrol tank, also accommodating first aid tank behind driver's seat, and main hose box large enough to carry 1,500ft. of canvas hose, jumping sheet, etc. In addition long boxes with hinged lids fitted between mudguards, the top forming side steps and covered with pyramid pattern aluminium tread and brass edging. Brass hand rails placed on top of body, also driver's seat, and, in addition, a leather cushion to be provided.

SPARES, TOOLS, ETC.—

Box spanners	Taper pins
Screwdrivers	1 Foot steam hose pipe
1 File	2 Engine spanners
1 Oil can	Washers
Copper and asbestos washers	2 Hose pipe clips
Pliers	Insulation tape
Hammer	1 each large and small adjustable spanner
Asbestos string	1 Brass horn
Spare bolts and nuts	Necessary spanners, etc., for pump and hose fittings, including large spanner for tightening suction hose.
Split pins	
1 Petrol funnel	
4 Sparking plugs	

LAMPS.—Electric, consisting of two side and one tail with wiring, switches, and 60 ampere 4 volt accumulator in duplicate.

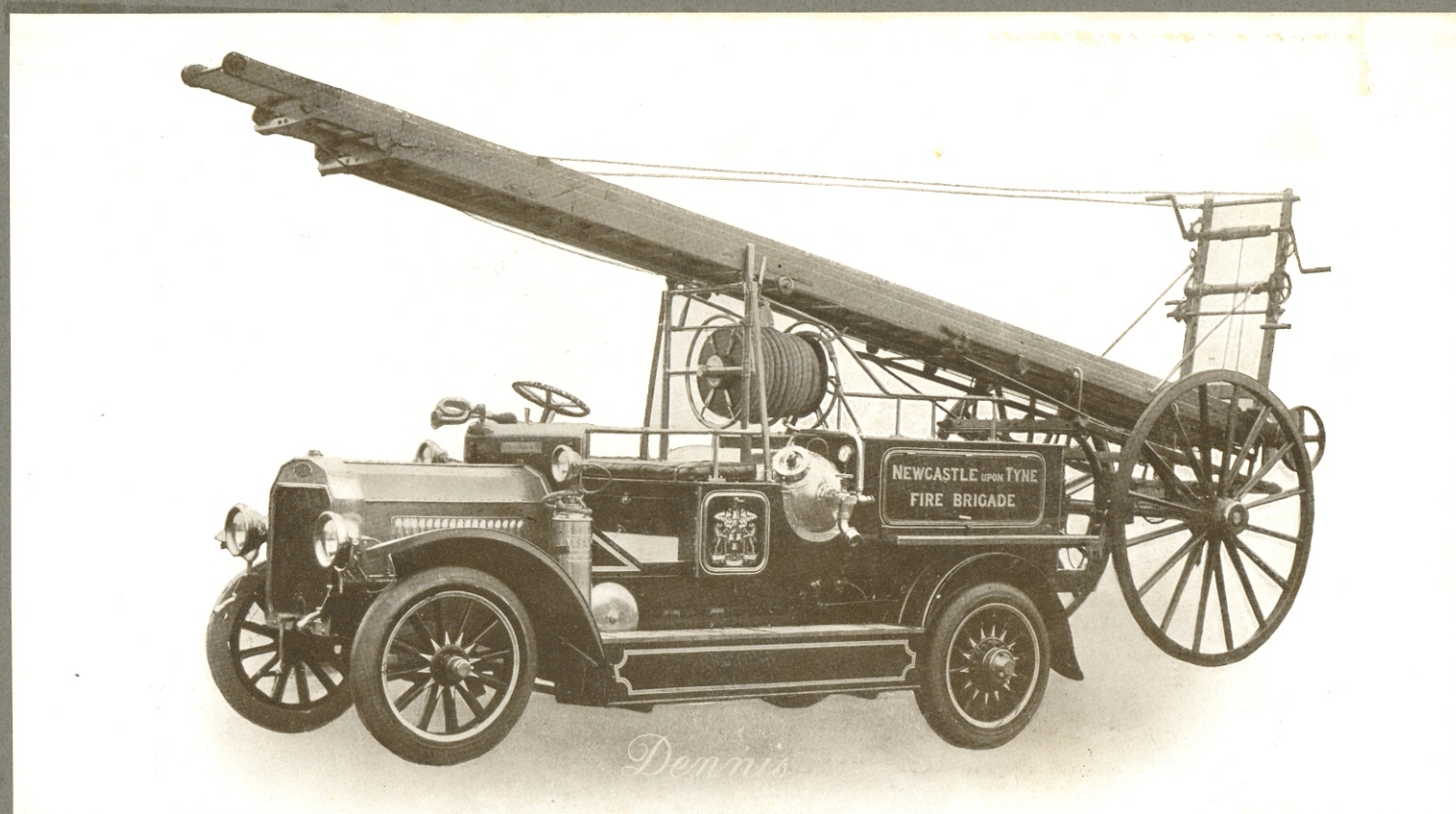
Price for Engine complete, to this specification, £775

Extra price quoted for fitting and supply of sliding carriage wheeled escape.

SHIPPING PARTICULARS PACKED—LESS ESCAPE LADDERS.—

Length	...	...	...	...	...	...	...	16ft. 6in.
Width	...	...	...	...	...	...	...	8ft. 6in.
Height	...	...	...	...	...	...	...	6ft. 6in.
Total weight, packed	...	...	...	...	...	...	...	4 tons
Price for packing and delivery F.O.B. London, £25.								

“ Dennis ” Motor Fire Tender



REPEAT ORDER FOR NEWCASTLE-ON-TYNE FIRE BRIGADE.

All classes of Motor Fire Tenders supplied with and without escapes or chemical and first aid appliances. Also Motor Ambulances, Rescue and Salvage Corps Motors.

"Dennis" Portable Motor Fire Appliances



Two Engines supplied to the G.E. Rly. Co. for the protection of their Stratford Works. Two exactly similar Engines supplied to HIS MAJESTY THE KING OF SIAM for the PROTECTION of the ROYAL PALACE AT BANGKOK. All classes of Portable Fire Engines supplied for Depôt and Works Protection, including Rail Motors as supplied to THE ANGLO-PERSIAN OIL CO.
FOR SPECIFICATION AND PARTICULARS SEE PAGE 23.

General Specification of "Dennis" Portable Turbine Motor Fire Pump

As illustrated on page 22

GENERAL.—The machine is designed to meet the requirements of fire protection for works extending over a somewhat scattered area, and where the existing water pressure in the mains is not sufficient for an effective fire jet, but requires augmenting. The question of portability and weight reduction has been closely studied, bearing in mind awkward right angle turnings, low archways and an uneven track often have to be negotiated. Reliability has been studied and a duplicate system of ignition fitted to the motor to assist this end. The cost of upkeep is practically nil. A turn of the starting handle and the machine is ready for instant use.

ENGINE.—Is of the four cylinder pattern, each cylinder cast separately, and valves on opposite sides. Oil tempered crank shaft with ground bearing surfaces, also hardened and ground cam shafts, and steel timing gear wheels cased in and running in oil. A bearing is provided between each throw of the crank. The power developed would be 45 to 50 on the brake.

LUBRICATION.—The lubricating system of the engine is of the pressure feed kind, and the oil is circulated automatically by means of a duplex gear-driven pump; the oil is retained in a large oil tank placed in a convenient position under the bonnet. No adjustment is required and there is therefore no fear of mistakes in inexperienced hands.

PUMP.—The pump is of the turbine or centrifugal high pressure type. It is made by Messrs. Gwynnes, of Hammersmith, and is of the multi-stage description with impellers, etc., cast in Manganese bronze. The pump will deliver 300 gallons per minute at approximately 120 lbs. pressure when working through 100ft. length of 2½ in. diameter unlined hose.

INLET.—Polished gunmetal V thread fitting supplied suitable for 4in. suction hose.

SUCTION HOSE.—A 15ft. length of 4in. suction hose of usual best quality armoured pattern, supplied complete with copper strainer and also foot valve.

OUTLET.—A two-way polished gunmetal outlet valve fitted, controlled by hand wheels, and arranged with suitable connections to take delivery hose.

IGNITION (in duplicate).—A Bosch high tension magneto fitted; also duplicate system of accumulator ignition with coil and distributor. Eight sparking plugs being fitted in all; separate switches for each ignition are provided, so that both together or either separately can be used.

CONTROL.—Levers are arranged on a steel "dashboard" in suitable position for controlling the ignition and throttle; also a lever is provided for controlling the clutch.

CLUTCH.—A leather-lined cone clutch and fly wheel is fitted between crankshaft of motor and pump.

UNIVERSAL JOINT.—A double universal joint is fitted between the clutch and pump to provide for any lack of alignment caused by "whip" of the frame, preventing undue strain on either crank or pump shafts from this cause.

BRAKES.—Internal expanding drum brakes provided on the rear wheels, of usual motor car design and operated by a single lever at the rear of the machine.

FRAME.—Of channel steel well stayed and rivetted together with angle plates at the corners. Engine supported on a separate underframe.

WHEELS.—The wheels would be strongly constructed of wood, artillery pattern, with crucible cast malleable hubs.

TYRES.—32in. rubber band type, of suitable section.

AXLES.—Of best forged steel and suitable design.

STEERING.—This would be arranged on the "Ackerman" principle in preference to the usual "fore carriage," which will minimise the risk of tendency to turn over, if carelessly handled. The axle swivels will be arranged on ball bearings, so that movement will be easy.

COOLING.—A large polished brass radiator will be fitted capable of keeping the engine cool under all conditions.

BONNET.—A planished steel bonnet of hinged pattern will be fitted to cover up the engine and an attractive finish studied by fitting polished brass louvres.

PETROL TANK.—A steel tank would be fitted in suitable position, holding enough petrol for a four hours' continuous run.

SPARES AND TOOLS.—

Box spanners	Oil can	Petrol funnel
Screwdrivers	Pliers	4 Sparking plugs
File	Hammer	2 Engine valve cap spanners.

And all other necessary tools in roll kit bag.

**Price for Machine complete, to this specification,
£550 nett**

SHIPPING DIMENSIONS PACKED.—

Length...	...	...	...	...	...	...	...	10ft. 3in.
Height...	...	...	...	...	...	...	...	4ft. 6in.
Width...	...	...	...	...	...	...	...	4ft. 6in.
Weight...	...	...	...	...	...	...	...	2 tons 2 cwt.

Cost of packing and delivery F.O.B. London, £12.

General Specification of "Dennis" 75 h.p. 6-Cylinder Stationary Turbine Motor Pumping Plant

As illustrated on page 25

ENGINE.—The engine to be of the vertical type having six cylinders, 127 m/m. bore by 150 m/m. stroke, to develop 75 h.p. at 1,200 r.p.m.

CRANKCASE.—The crankcase to be of aluminium, formed in two parts bolted together. The crankshaft to be supported in the upper half.

BEARINGS.—The engine to have seven main bearings of phosphor bronze lined with white metal. The bearings to be fitted with liner strips to facilitate adjustment. Each bearing to be fed with oil from the main circulation.

CRANKSHAFT.—The crankshaft to be of nickel chrome steel forged in one piece, to have six throws arranged to give a complete balance of rotating parts and regular intervals of firing. The lubrication of the crank pins to be by means of oil scoops on the big end of the connecting rod. A flange to be provided for bolting up to the flywheel.

CONNECTING RODS.—The connecting rods to be of high tensile steel with white metal lined phosphor-bronze big end bearings.

PISTONS.—The pistons to be of cast iron accurately ground to suit the cylinders, and each to be fitted with four cast iron rings.

CYLINDERS.—The cylinders to be cast separately, and to be of hard fine grained cast iron. Liberal water jackets to be provided. The valves to be on opposite sides operating underneath.

VALVES.—The induction and exhaust valves to be interchangeable, and made from solid forgings of special valve steel. The valves to be operated from the cam shaft by tappets with adjustment for clearance. The tappets to be of mild steel case hardened.

CAM SHAFT.—The cam shaft to be of mild steel, case hardened, with the cams securely fixed in position. To be driven from the cam shaft by spur gearing. The cams to be profiled to give rapid opening and closing of the valve, and, at the same time, gentle contact with the seating.

CARBURETTER.—The carburetter to be hand controlled and automatically to provide a constant strength of mixture for all engine speeds. The carburetter to be readily adjustable, so that the strength of mixture can be varied. All joints in the petrol and mixture pipes to be tight so as to avoid the possibility of escape of liquid petrol or gas during working.

IGNITION.—The ignition to be of the dual type, comprising high tension Bosch magneto, accumulator and coil for starting purposes.

LUBRICATION.—The lubrication to be of the forced system in which the oil is continually circulated by rotary gear pumps. The engine to be provided with

two pumps, one to draw oil from the oil tank, and deliver it to the various bearings through the necessary pipes, and the other to return the oil from the crank chamber and deliver it to the tank for filtering. The pistons and gudgeon pins to be lubricated by splash.

WATER PUMP.—The water pump to be of the centrifugal type, driven from the cam shaft by spur gears.

PETROL CONSUMPTION.—The petrol consumption .69 pints per b.h.p. hour.

WORKMANSHIP AND MATERIAL.—The materials to be of the finest quality procurable, and all work executed by highly skilled workmen.

PUMP.—Of Gwynne's two-stage balanced type, having 7in. suction and delivery branches, mounted on cast iron bed plate, channel steel bearing provided for engine and pump. Pump shaft of nickel steel. Planished steel lagging round outside of pump with brass bands.

DUTY OF PUMP.—To give a maximum delivery of 500 gallons per minute at 300ft. total head at 1,200 r.p.m., and at slower speeds to deliver 600 gallons at 200ft. head.

CLUTCH.—Large diameter clutch and flywheel fitted, the clutch of the leather cone type, with outside spring adjustment and lever operating gear, enabling the engine to be run with the pump disconnected.

FLEXIBLE JOINT.—A flexible joint fitted between clutch and pump spindle.

PETROL TANK.—A 20-gallon tank fitted in suitable position over the pump.

RADIATOR.—A large radiator fitted to enable the engine to be run without depending entirely on the bye-pass from the pump to keep same cool, fan fitted to help the cooling effect.

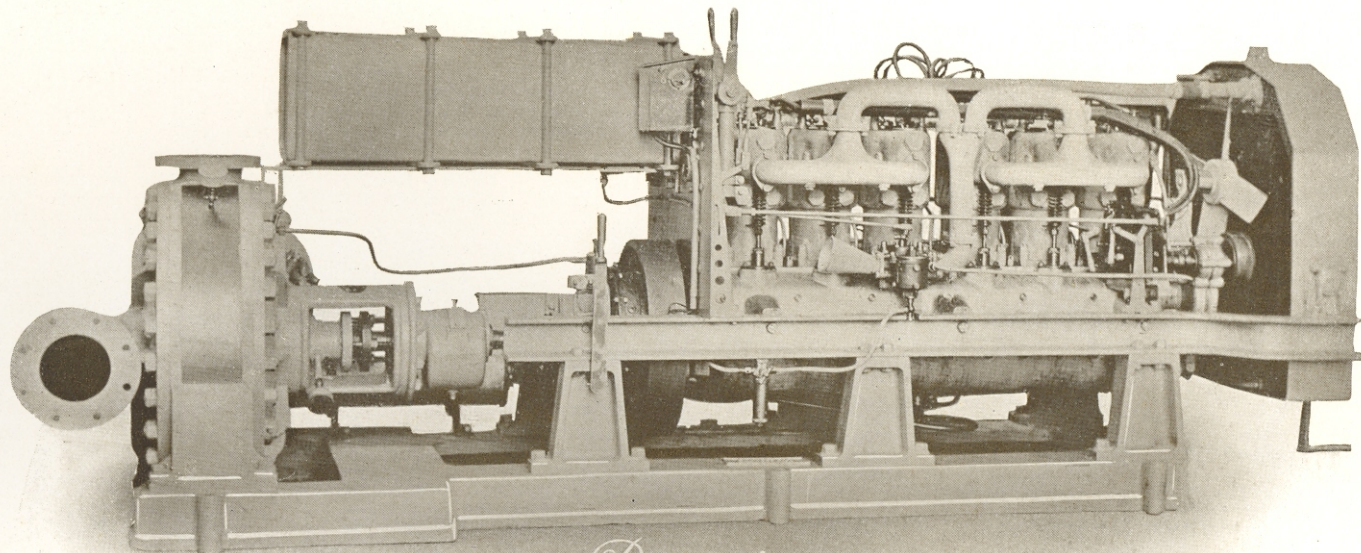
OUTLET AND INLET FITTINGS.—No suction hose or pipe or delivery valves provided for.

Price of complete plant, to specification, £560

SHIPPING DIMENSIONS, PACKED.—

Length	...	...	...	...	...	...	...	...	11ft. 6in.
Width	...	...	...	...	...	...	...	...	4ft. 2in.
Height	...	...	...	...	...	...	...	...	4ft. 8in.
Outside case weight	...	...	...	...	...	...	...	...	2 tons.
Cost of packing and delivering, F.O.B. London, £12.									

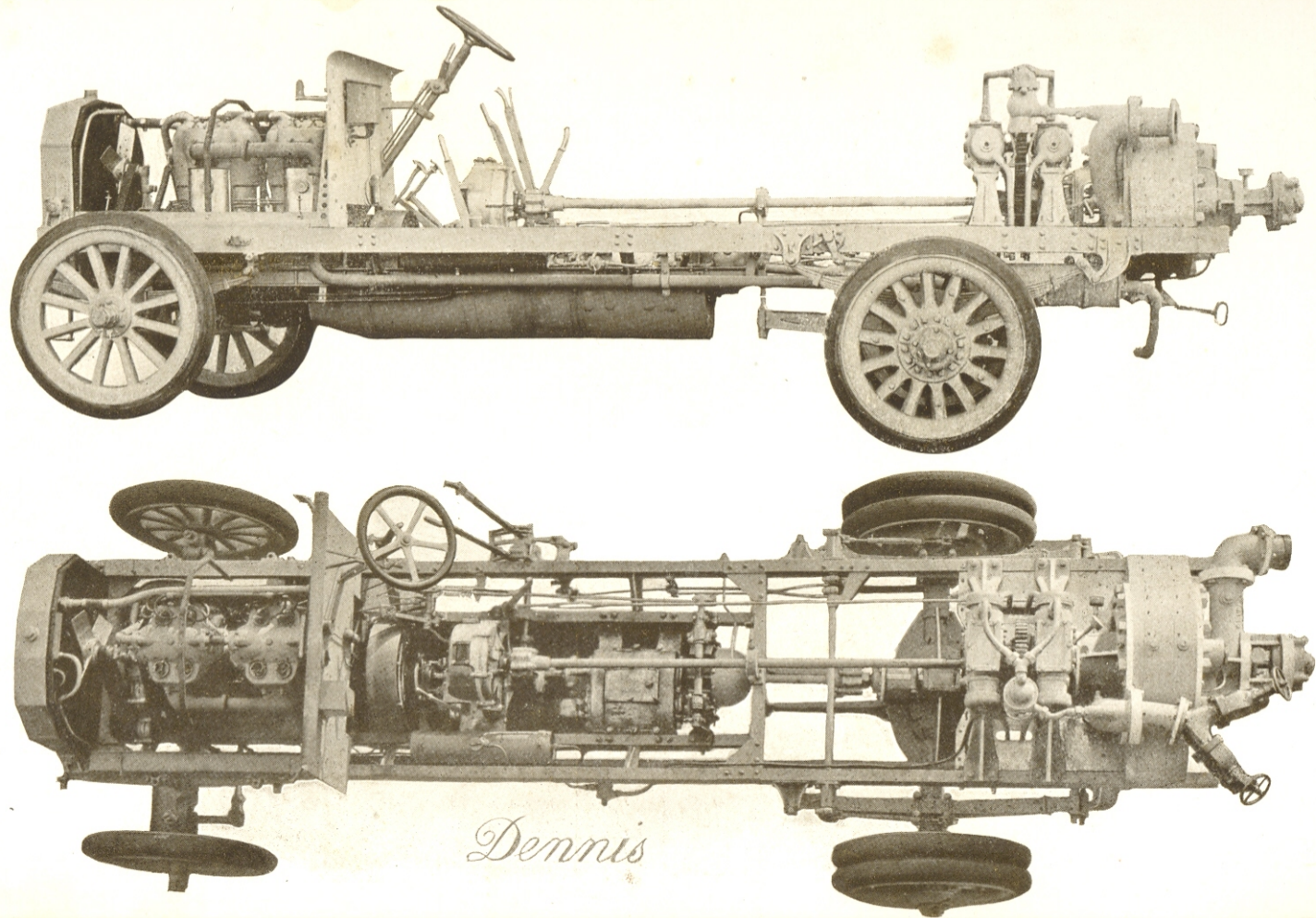
Stationary Turbine Motor Pumping Plant



Three Sets supplied to the BURMAH OIL CO. for the Protection of their Oil Depôts against Fire.
All classes and sizes of Motor Pumping Plant for Fire Protection or other purposes quoted for on receipt of particulars of requirements.

FOR SPECIFICATION AND PARTICULARS SEE PAGE 24.

Showing General Arrangement of Motor Fire Engine Chassis



Note special features of "Dennis" design:—TURBINE PUMP, WORM DRIVE REAR AXLE, AIR PUMP IN DUPLICATE, CASED-IN VALVES TO ENGINE, WATERPROOF IGNITION APPARATUS, OUTSIDE ADJUSTMENT TO CLUTCH, AUTOMATIC PRESSURE FEED LUBRICATING SYSTEM TO ENGINE, FULL UNIVERSAL JOINTS AT ENDS OF ALL SHAFTS, Etc.

Useful Information

One Imperial Gallon	= 277.274 Cubic Inches
" " "	= .16 Cubic Foot
" " "	= 10.00 Lbs.
" " "	= 1.2 U.S. Gallon
" " "	= 4.537 Litres
One U.S. Gallon	= 231 Cubic Inches
" " "	= .133 Cubic Foot
" " "	= 8.33 Lbs.
" " "	= .83 Imperial Gallon
" " "	= 3.8 Litres
One Cubic Inch of Water	= .03607 Lb.
" " " "	= .003607 Imperial Gallon
" " " "	= .004329 U.S. Gallon
One Cubic Foot of Water	= 6.23 Imperial Gallons
" " " "	= 7.48 U.S. Gallons
" " " "	= 28.375 Litres
" " " "	= .0283 Cubic Metre
" " " "	= 62.35 Lbs.
" " " "	= .557 Cwt.
" " " "	= .028 Ton
One Lb. of Water	= 27.72 Cubic Inches
" " "	= .10 Imperial Gallon
" " "	= .83 U.S. Gallon
" " "	= .4537 Kilo
One Cwt. of Water	= 11.2 Imperial Gallons
" " "	= 13.44 U.S. Gallons
" " "	= 1.8 Cubic Foot
One Atmosphere	= 1.054 Kilos. per square inch
A Column of Water 1 foot high	= .434 Lb. Pressure per square inch
A Column of Water 1 metre high	= 1.43 Lb. Pressure per square inch
A Pressure of 1 lb. per square inch	= 2.31 Feet of Water in height
One Imperial Gallon Crude Petroleum	= 8.2 Lbs. (Approximately)
One U.S. Gallon Crude Petroleum	= 6.5 Lbs. (Approximately)
One Ton Petroleum	= 275 Imperial Gallons (Approximately)
" " "	= 360 U.S. Gallons (Approximately)
One Ton of Water	= 35.9 Cubic Feet
" " "	= 224 Imperial Gallons
" " "	= 268.8 U.S. Gallons
" " "	= 1000 Litres (Approximately)
One Litre of Water	= 1 Cubic Metre (Approximately)
" " "	= .22 Imperial Gallon
" " "	= .264 U.S. Gallon
" " "	= 61 Cubic Inches
" " "	= .0353 Cubic Foot

One Cubic Metre of Water	= 220 Imperial Gallons
" " " "	= 264 U.S. Gallons
" " " "	= 1.308 Cubic Yards
" " " "	= 61028 Cubic Inches
" " " "	= 35.31 Cubic Feet
" " " "	= 1000 Kilos
" " " "	= 1 Ton (Approximately)
" " " "	= 1000 Litres
One Kilo. of Water	= 2.204 Lbs.

Metrical Equivalents of British Measures of Length

	ENGLISH.		FRENCH.
Inch	= 25.39954 millimetres	Millimetre	= 0.03937 in.
Foot	= 3.047850 decimetres	Centimetre	= 0.393708 in.
Yard	= 0.91438325 metre	Decimetre	= 3.937079 in.
Fathom	= 1.82876696 metre	Metre	= { 39.37079 in.
Pole	= 5.02911 metres		{ 3.2808992 ft.
Furlong	= 201.16437 metres		{ 1.093633 yd.
Mile	= 1609.3146 metres	Kilometre	= 1093.633 yds.
Nautical mile	= 1855.020 metres	Myriametre	= 6.2138 miles

To convert pressure in lbs. per square inch into head in feet

Multiply the pressure by 2.307.

Example—150 lbs. pressure \times 2.307 = 346 feet head (approx.).

To convert head in feet to pressure per square inch

Multiply head in feet by .4335.

Example—300 feet head \times .4335 = 130 lbs. pressure (approx.).

To find number of gallons per minute delivered through nozzle

Gallons per minute = $\sqrt{H} \times d^2 \times .24$.

Where H = Head in feet.

d = Diameter of nozzle in $\frac{1}{16}$ th of an inch.

G = Gallons per minute.

Example—Size of nozzle $1\frac{1}{2}$, pressure 140 lbs.

First convert 140 lbs. pressure into head in feet = 323 (approx.).

Therefore $\sqrt{323} \times 9^2 \times .24 = 18 \times 81 \times .24 = 350$ gallons (approx.).

Horse-power represented by jet of water

$$\text{H.P.} = \frac{W \times P \times 2.3}{33,000}$$

Where W = Weight of water in lbs. delivered per minute.

P = Pressure of water in lbs. per square inch.

Example— $1\frac{1}{2}$ jet at 140 lbs. pressure =

$$\text{H.P.} = \frac{3,500 \times 140 \times 2.3}{33,000} = 34.5$$

Approximate Discharge in Gallons per Minute

PRES- SURE IN LBS. PER SQ. INCH	DIAMETER OF NOZZLE															HEAD IN FEET
	$\frac{1}{8}$ in.	$\frac{3}{16}$ in.	$\frac{1}{4}$ in.	$\frac{5}{16}$ in.	$\frac{3}{8}$ in.	$\frac{7}{16}$ in.	$\frac{1}{2}$ in.	$\frac{5}{8}$ in.	$\frac{3}{4}$ in.	$\frac{7}{8}$ in.	1 in.	$1\frac{1}{8}$ in.	$1\frac{1}{4}$ in.	$1\frac{1}{2}$ in.	2 in.	
	GALLONS DISCHARGED PER MINUTE															
50	2.58	5.8	10.03	16.1	23.2	31.6	41.3	64.4	92.75	126.5	165.0	209.0	257.0	371.5	660.0	115
55	2.70	6.09	10.08	16.9	24.14	33.0	43.1	67.5	97.0	132.5	173.0	218.4	270.0	385.0	691.5	127
60	2.8	6.35	11.25	17.6	25.4	34.5	45.0	70.4	101.5	138.2	180.5	228.2	282.0	405.0	722.5	138
65	2.93	6.62	11.75	18.4	26.4	36.0	47.0	73.5	105.8	144.0	188.0	238.0	294.0	423.0	752.5	150
70	3.04	6.83	12.2	19.0	27.3	37.2	48.7	76.0	109.8	149.0	195.0	246.5	304.0	437.5	777.5	161
75	3.15	7.1	12.62	19.75	28.3	38.6	50.05	78.8	113.6	154.8	202.0	256.0	315.0	455.0	807.5	173
80	3.26	7.34	13.01	20.04	29.3	40.0	52.3	81.5	117.5	160.0	208.4	264.5	326.0	470.0	835.0	185
85	3.36	7.54	13.42	21.0	30.1	41.02	53.74	83.8	121.0	164.8	215.0	272.0	336.0	484.0	861.0	196
90	3.45	7.78	13.85	21.75	31.0	42.4	55.4	86.5	124.8	170.0	221.5	280.7	346.0	497.5	885.0	208
95	3.55	8.0	14.2	22.3	31.9	43.5	57.2	89.4	127.8	174.0	227.0	287.0	354.0	510.0	907.5	219
100	3.63	8.18	14.54	22.78	32.75	44.45	58.3	91.0	131.0	178.4	233.0	295.0	364.0	524.0	932.5	230
105	3.73	8.38	14.9	23.3	33.5	45.7	59.6	93.0	134.2	182.8	239.0	302.5	372.8	535.0	955.0	242
110	3.84	8.64	15.35	24.0	34.5	47.0	61.4	95.8	138.3	188.0	242.8	311.0	384.0	552.5	984.0	254
115	3.91	8.8	15.64	24.45	35.2	47.5	62.5	97.75	141.0	191.8	250.2	317.0	391.0	562.5	1000.0	266
120	3.98	8.97	15.94	25.0	35.9	48.8	63.7	99.6	143.9	195.9	255.0	323.0	398.0	574.0	1021.0	276
125	4.05	9.17	16.3	25.5	36.7	50.0	65.25	102.0	147.0	200.0	260.5	330.5	407.5	586.0	1045.0	289
130	4.15	9.35	16.6	26.0	37.4	50.9	66.4	104.0	149.0	204.0	266.0	337.0	415.0	598.0	1065.0	300
135	4.24	9.5	16.9	26.5	38.0	51.8	67.6	105.4	152.5	207.0	270.4	343.0	422.5	610.0	1084.0	311
140	4.3	9.7	17.3	26.9	38.8	52.75	68.0	107.8	155.0	210.5	275.0	348.0	430.0	620.0	1100.0	323
145	4.38	9.86	17.5	27.4	39.4	53.6	70.0	109.5	158.0	215.0	280.2	355.0	439.0	630.0	1125.0	334
150	4.45	10.0	17.8	27.95	40.0	54.6	71.5	111.5	160.8	219.0	285.4	362.0	446.0	642.5	1142.0	346
155	4.55	10.02	18.2	28.4	40.9	55.7	72.5	113.8	164.0	222.1	290.0	368.0	454.0	652.5	1162.0	357
160	4.6	10.04	18.5	28.8	41.27	56.4	73.6	115.2	166.0	225.8	295.0	373.0	457.5	658.9	1170.0	369

Guarantee and Terms of Payment

GUARANTEE.—WORM GEAR.—We guarantee the worm gear of all "Dennis" vehicles for two years from the date of leaving our Works, provided it is not subjected to misuse or neglect on the conditions given below.

GUARANTEE.—The Company guarantee that in the event of any part or parts of the machine (except as hereinafter mentioned) requiring replacement, during a period of SIX MONTHS FROM DATE OF DELIVERY, by reason of defects due to faulty material or bad workmanship, the Company will supply to the Purchaser, free of charge, duplicates of such parts in exchange for those defective, and will forward such duplicate parts to any address in the UNITED KINGDOM, CARRIAGE FORWARD, and if the Purchaser desires it, the Company will also, upon being paid by the Purchaser the usual charges for the same, carry out all work which may be necessary in connection with fitting the machine with such substituted part or parts, provided :—

1. This guarantee does not apply to tyres or electric ignition apparatus, as to which the Company give no guarantee of any kind, either expressed or implied.
2. The benefit of this guarantee is limited to the Purchaser of the machine, whilst the owner in possession thereof, and is not to extend to any other person.
3. The defective part or parts must be forwarded by the Purchaser, CARRIAGE PAID, to the Company's works.
4. Except as to the liability expressly undertaken by the Company in this guarantee, they are not to be liable for any consequential or other damage arising from any cause whatever in connection with the manufacture or sale of the car or chassis, or any part of the same.
5. This guarantee is given and accepted in substitution for and to the exclusion of any statutory or other guarantee implied by law.

PAYMENT.—Cash on completion of satisfactory trials at Guildford.

NOTE.—Our Fire Brigade Department is treated entirely separate from our commercial vehicle and other departments, and any arrangements made as to representation in one of these branches is not to be assumed to include Fire Brigade appliances without special arrangements are made.

